

**REMARKS**

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 21, 23-29, 31, 33-36 and 38-40 are now present in the application. Claims 21, 24, 27, 31 and 35 have been amended. Claims 21, 24, 27, 31 and 35 are independent. Reconsideration of this application, as amended, is respectfully requested.

**Claim Rejections Under 35 U.S.C. § 103**

Claims 21, 23, 31, 33-36, 38 and 40 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Takashi, JP 2001-0274096, in view of Kaneyama, U.S. Patent No. 6,452,214, and further in view of Koide, U.S. Patent Application Publication No. US 2001/0048112. Claims 24-29 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Takashi in view of Koike, U.S. Patent No. 7,141,444, and further in view of Koide. Claim 39 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Takashi in view of Kaneyama and Koide, and further in view of Yuasa, U.S. Patent No. 6,017,774. These rejections are respectfully traversed.

Complete discussions of the Examiner's rejections are set forth in the Office Action, and are not being repeated here.

In light of the foregoing amendments to the claims, Applicant respectfully submits that these rejections have been obviated and/or rendered moot. Without conceding to the propriety of the Examiner's rejections, but merely to timely advance the prosecution of the application, as the Examiner will note, independent claims 21, 24, 27, 31 and 35 have been amended.

Independent claims 21 and 24 have been amended to recite a combination of elements including "an n type GaN based layer on the first GaN based layer, wherein the n type GaN

based layer comprises a semi-insulating GaN based layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer.”

Independent claim 27 and 31 have been amended to recite a combination of elements including “a second n type GaN based layer on the first n type GaN based layer, wherein the second n type GaN based layer comprises a semi-insulating GaN based layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer.”

Independent claim 35 has been amended to recite a combination of steps including “forming an n type GaN based layer on the first GaN based layer, wherein the n type GaN based layer comprises a semi-insulating GaN based layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer.”

Support for the amendments to claims 21, 24, 27, 31 and 35 can be found in FIG. 3 and on page 8, lines 27-35 and page 9, lines 1-4 of the specification as originally filed. Applicant respectfully submits that the above combinations of elements and steps set forth in claims 21, 24, 27, 31 and 35 are not disclosed or suggested by the references relied on by the Examiner.

As embodied on page 8, lines 27-35 and page 9, lines 1-4 of the specification, the n-GaN layer 308 can be formed with a semi-insulating GaN layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer.

The Examiner referred to Takashi’s clay layer 9 as the n type GaN layer of the present invention. However, Takashi simply discloses that the clay layer 9 is made of  $\text{n-Al}_{0.07}\text{Ga}_{0.93}\text{N}$  (see Table 2). Takashi nowhere discloses that the clay layer 9 comprises “a semi-insulating GaN

based layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer” as recited in claims 21, 24, 27, 31 and 35.

Koide also fails to cure the deficiencies of Takashi. In particular, although Koide in FIG. 3 and paragraph [0048] discloses n-GaN layers (3a, 3b), Koide simply discloses that the GaN layer 3a is silicon doped layer with a carrier concentration of  $2 \times 10^{18}/\text{cm}^3$  and the GaN layer 3b is a silicon doped n-GaN layer with a carrier concentration of  $2 \times 10^{17}/\text{cm}^3$ . However, Koide nowhere teaches that the n-GaN layers 3a and 3b comprise “a semi-insulating GaN based layer and a low concentration of below  $1 \times 10^{18}/\text{cm}^3$  doped n-GaN layer” as recited in claims 21, 24, 27, 31 and 35.

With regard to the Examiner’s reliance on the other secondary references, these references also fail to disclose the above combinations of elements and steps as set forth in independent claims 21, 24, 27, 31 and 35. Accordingly, these references fail to cure the deficiencies of Takashi.

In addition, claims 23, 25, 26, 28, 29, 33, 34, 36 and 38-40 depend, either directly or indirectly, from independent claims 21, 24, 27, 31 and 35, and are therefore allowable based on their respective dependence from independent claims 21, 24, 27, 31 and 35, which are believed to be allowable.

In view of the above remarks, Applicant respectfully submits that claims 21, 23-29, 31, 33-36 and 38-40 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

### CONCLUSION

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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